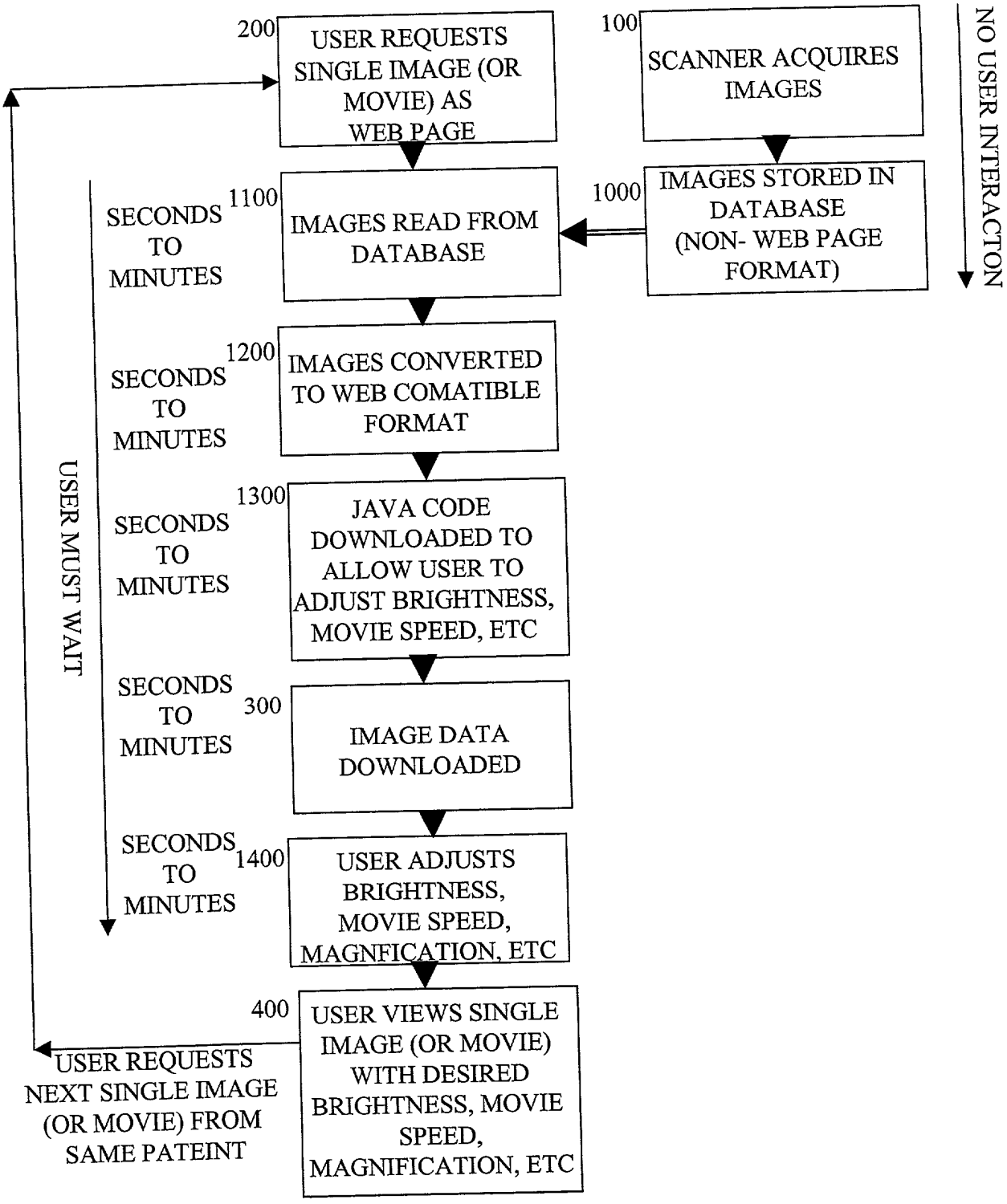


FIGURE 1 - Prior Art

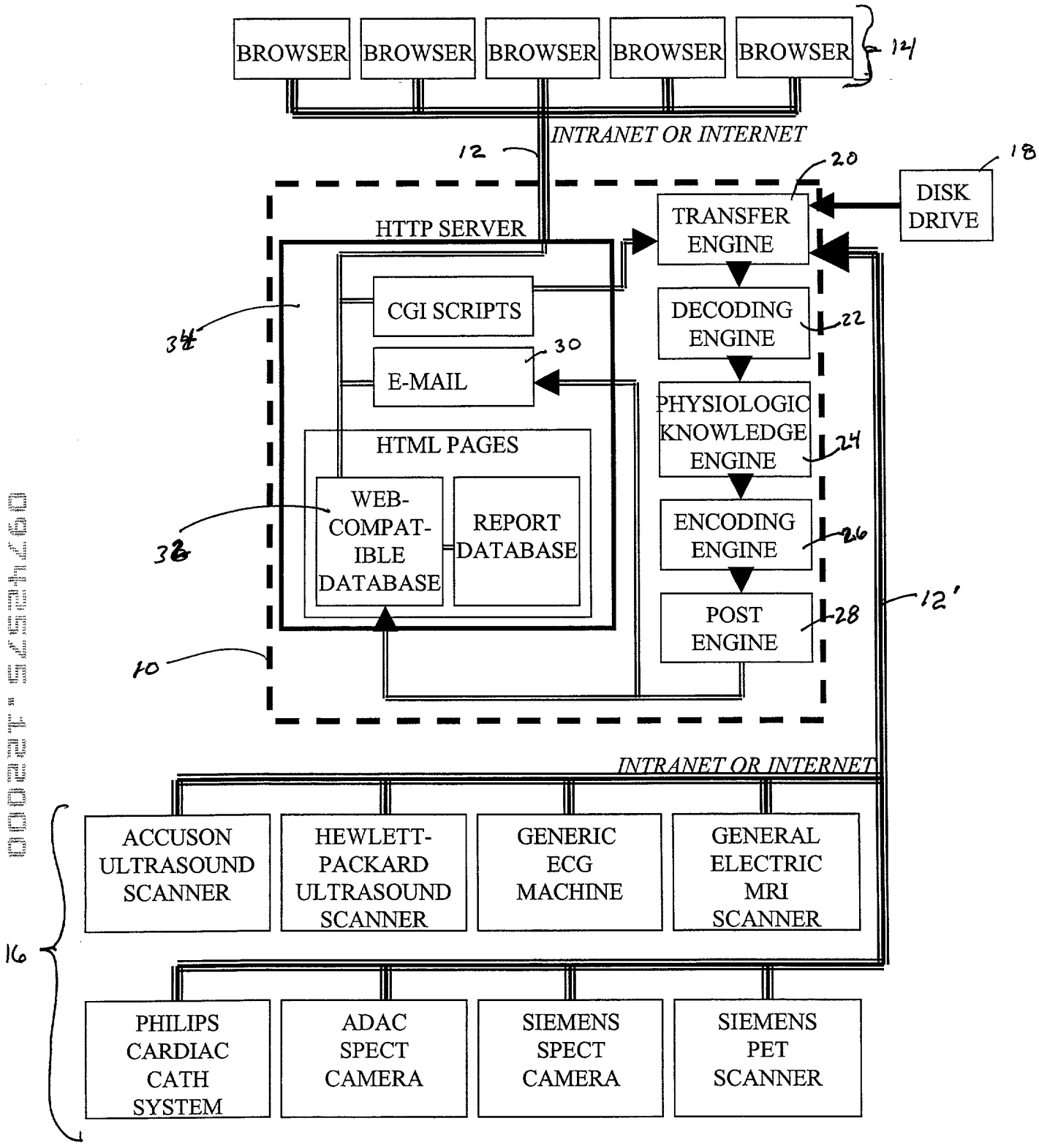

BROWSER
BROWSER
BROWSER
BROWSER
BROWSER
14
INTRANET OR INTERNET
12
20
18
DISK DRIVE
TRANSFER ENGINE
HTTP SERVER
CGI SCRIPTS
DECODING ENGINE
22
34
30
E-MAIL
PHYSIOLOGIC KNOWLEDGE ENGINE
24
HTML PAGES
WEB-COMPAT-IBLE DATABASE
REPORT DATABASE
36
ENCODING ENGINE
26
POST ENGINE
28
12'
10
INTRANET OR INTERNET
ACCUSON ULTRASOUND SCANNER
HEWLETT-PACKARD ULTRASOUND SCANNER
GENERIC ECG MACHINE
GENERAL ELECTRIC MRI SCANNER
16
PHILIPS CARDIAC CATH SYSTEM
ADAC SPECT CAMERA
SIEMENS SPECT CAMERA
SIEMENS PET SCANNER

FIGURE 2

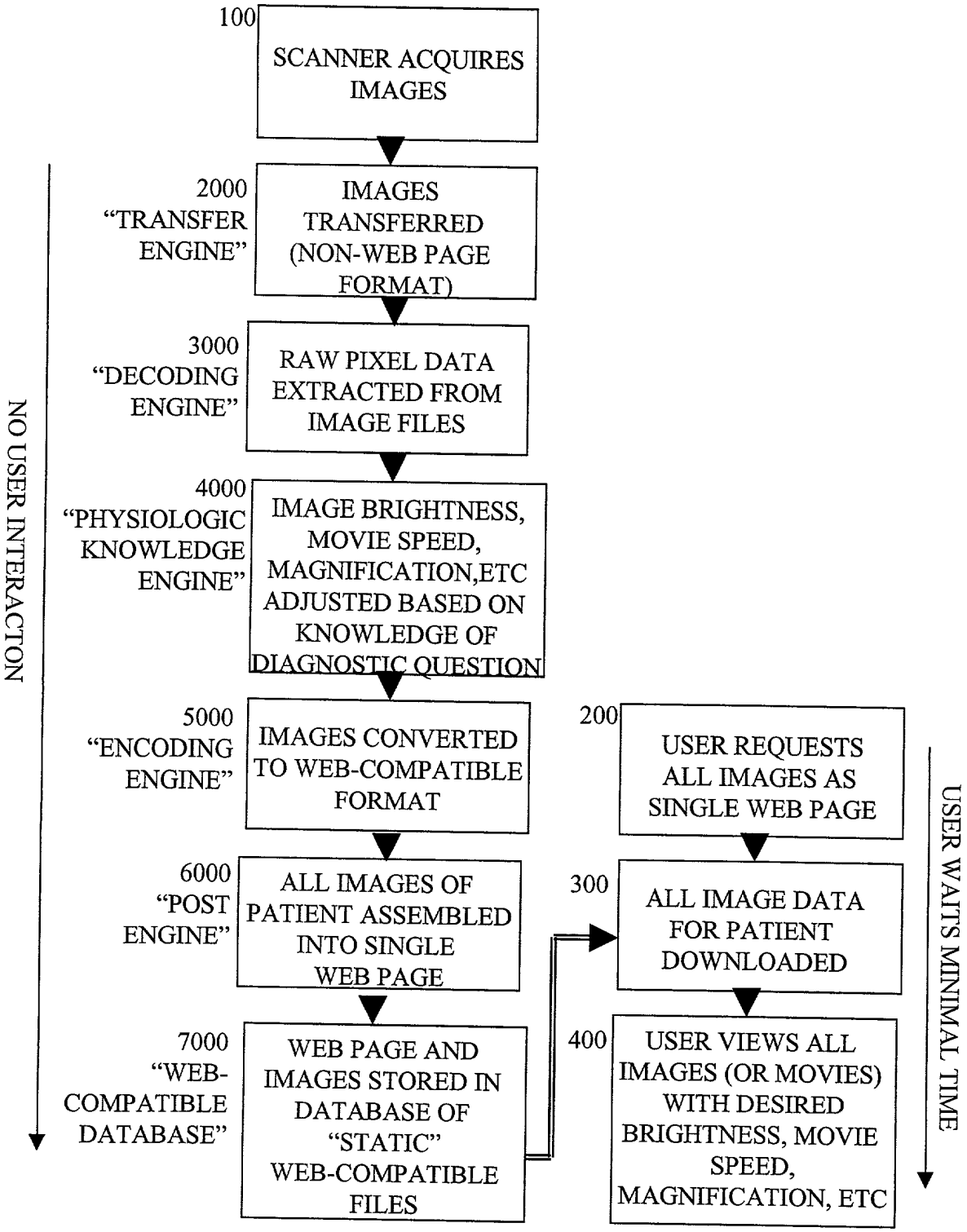
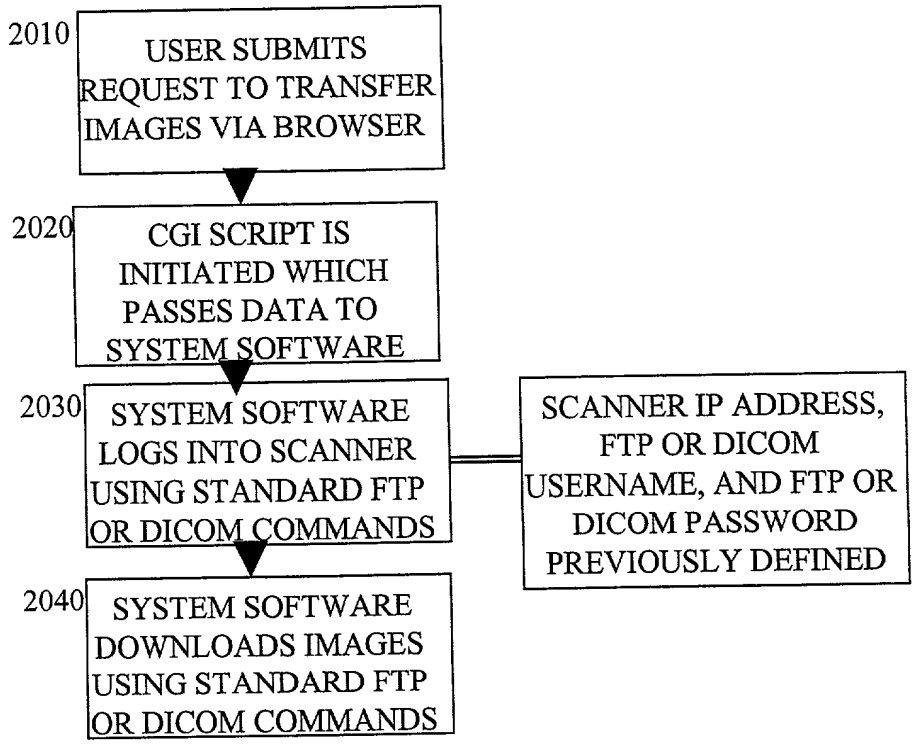


FIGURE 3 - System Overview

Fig. 4a

METHOD 1



- OR -

Fig. 4b

METHOD 2

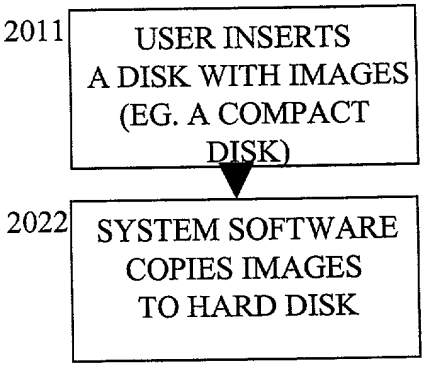
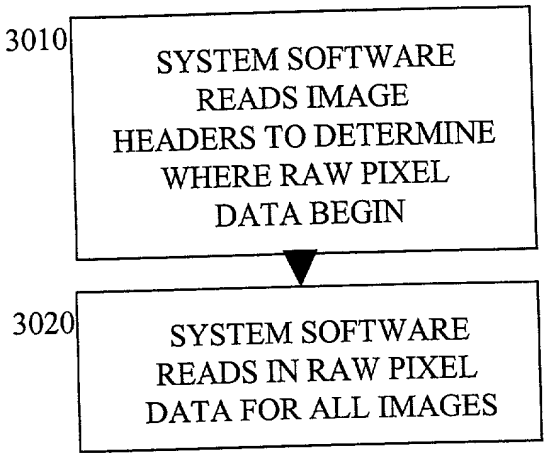


FIGURE 4 - STEP 2000 DETAILS ("TRANSFER ENGINE")

Fig. 5a

METHOD 1 FOR "STANDARD" IMAGE FORMATS (EG. DICOM)



- OR -

Fig. 5b

METHOD 2 FOR "NON-STANDARD" IMAGE FORMATS

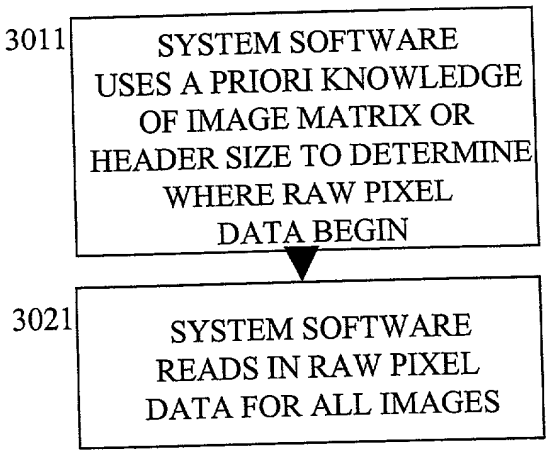


FIGURE 5 - STEP 3000 DETAILS ("DECODING ENGINE")

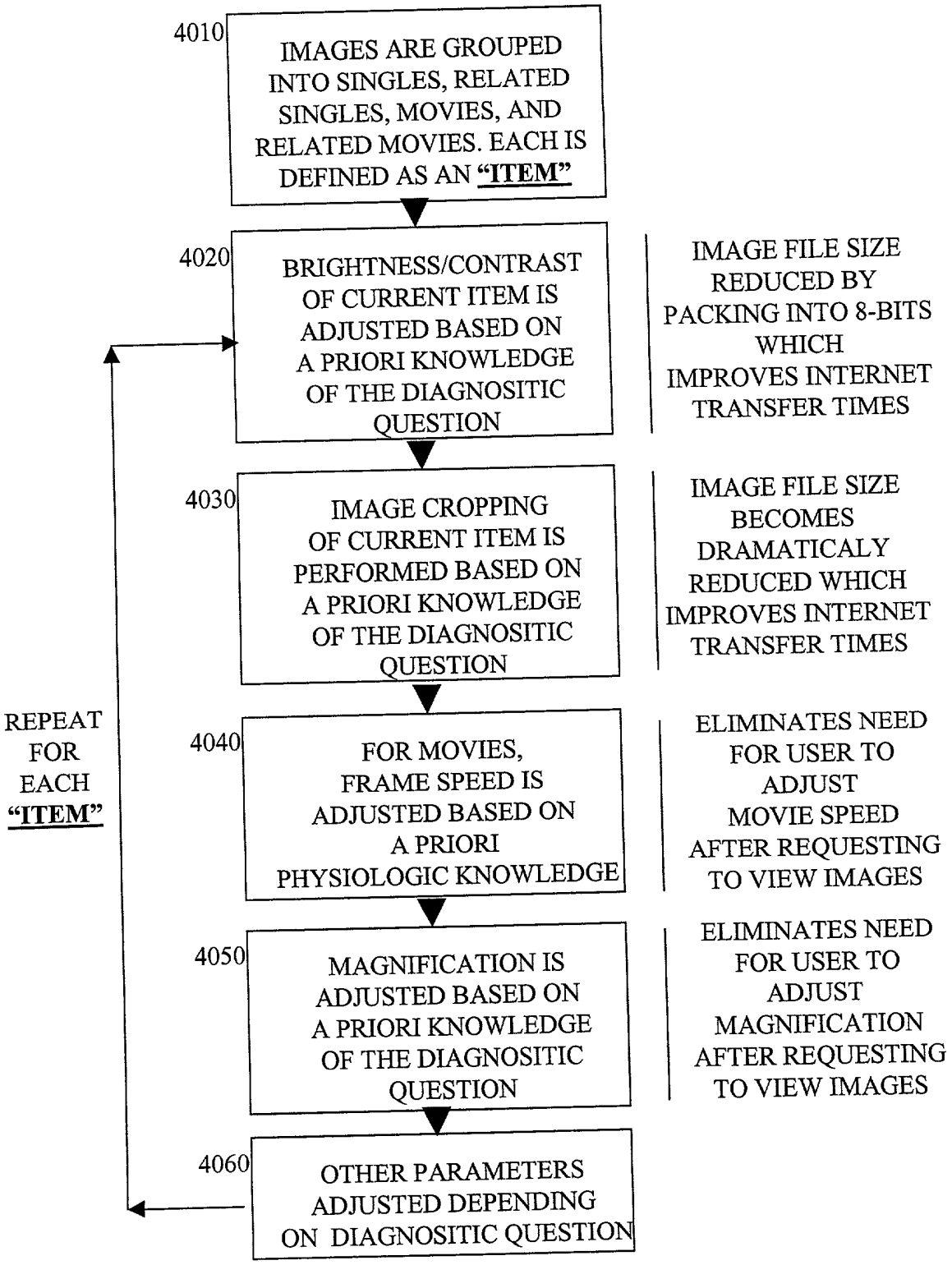


FIGURE 6 - STEP 4000 DETAILS ("PHYSIOLOGIC KNOWLEDGE ENGINE")

STEP 4020 - Define search region as subregion within image which contains the organ of interest (eg. heart) and search all movie frames for the single brightest pixel. Scale all movie frames by same amount to make single brightest pixel equal to 2 to the 8th power minus 1, eg. 255 (1 byte/pixel, 8-bit image).

STEP 4030 - Create thumbnail movies by cropping images such that only the organ of interest is shown (eg. heart).

STEP 4040 - Convert all movie frames into a single movie with frame rate chosen to simulate real time motion (eg. beating heart).

STEP 4050 - Create a full-field-of-view version of each thumbnail so that user can double-click to view additional details.

Fig. 7a

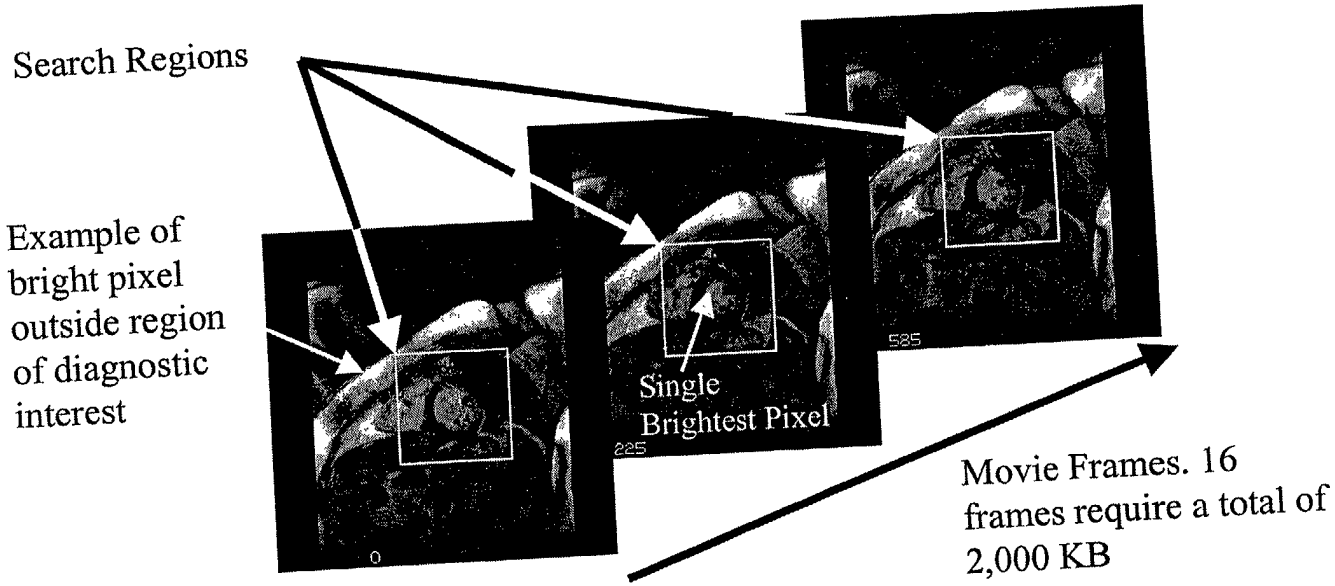

Search Regions
Example of bright pixel outside region of diagnostic interest
Single Brightest Pixel
0
225
585
Movie Frames. 16 frames require a total of 2,000 KB

Fig. 7b

Eg. STEP 4040
Thumbnail movie of beating heart
(16 frames=100KB)

Eg. STEP 4050
Full field-of-view movie displayed full screen when thumbnail clicked (16 frames=400KB)

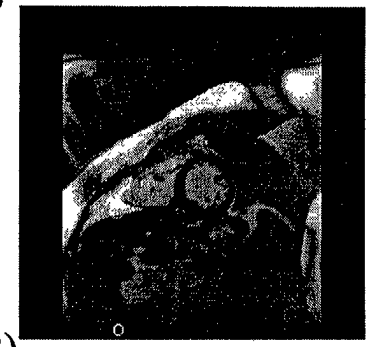


Fig. 7c

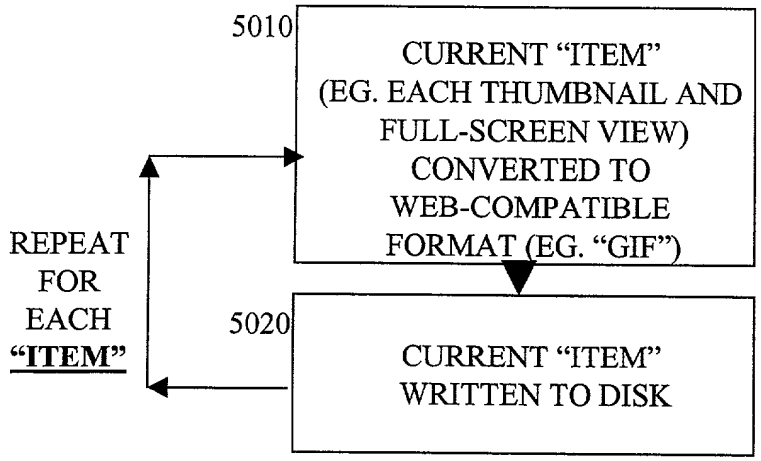


FIGURE 8 - STEP 5000 DETAILS
("ENCODING ENGINE")

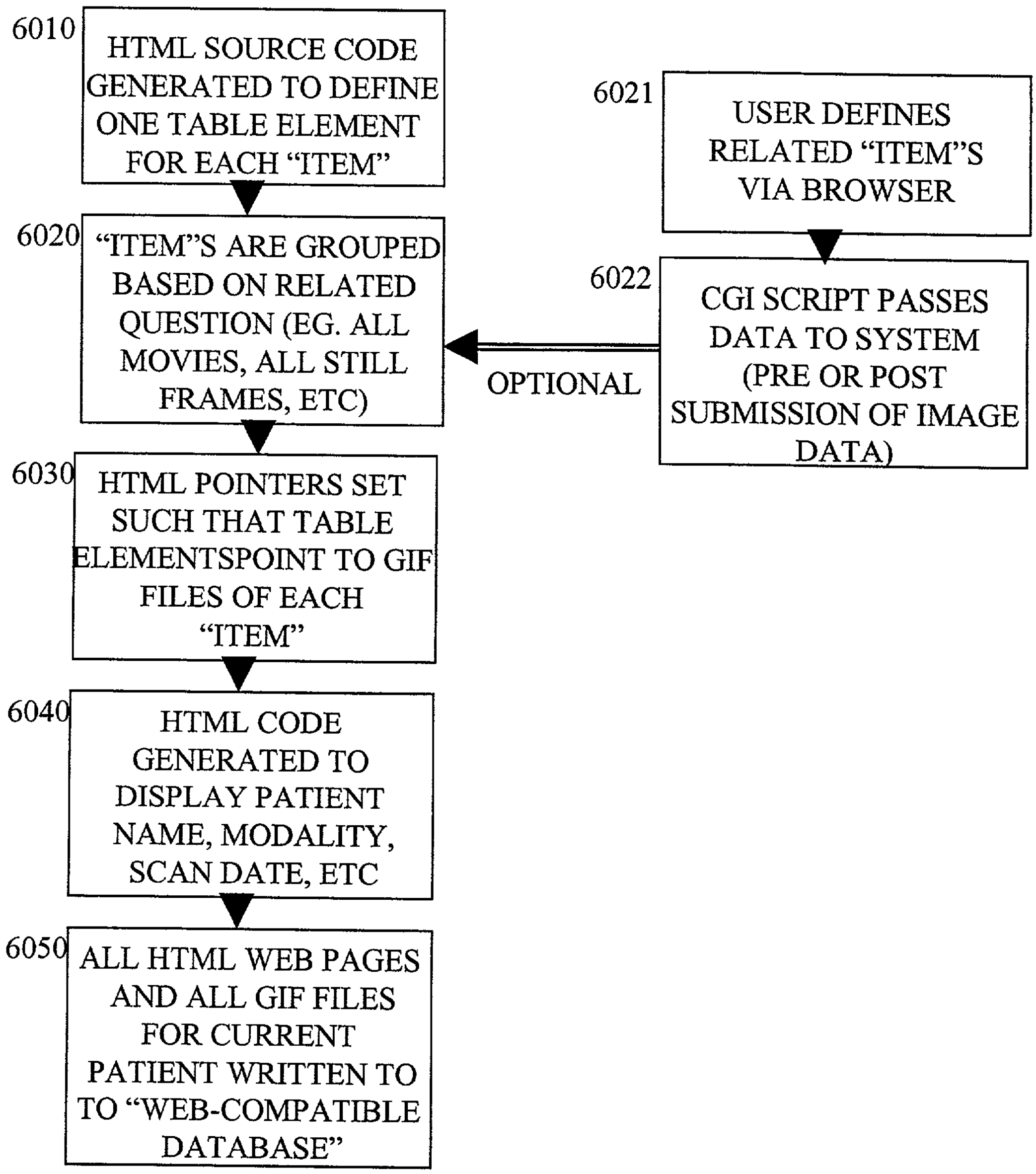

6010
HTML SOURCE CODE GENERATED TO DEFINE ONE TABLE ELEMENT FOR EACH "ITEM"
6021
USER DEFINES RELATED "ITEM"'S VIA BROWSER
6020
"ITEM"'S ARE GROUPED BASED ON RELATED QUESTION (EG. ALL MOVIES, ALL STILL FRAMES, ETC)
6022
CGI SCRIPT PASSES DATA TO SYSTEM (PRE OR POST SUBMISSION OF IMAGE DATA)
OPTIONAL
6030
HTML POINTERS SET SUCH THAT TABLE ELEMENTSPOINT TO GIF FILES OF EACH "ITEM"
6040
HTML CODE GENERATED TO DISPLAY PATIENT NAME, MODALITY, SCAN DATE, ETC
6050
ALL HTML WEB PAGES AND ALL GIF FILES FOR CURRENT PATIENT WRITTEN TO TO "WEB-COMPATIBLE DATABASE"

FIGURE 9 - STEP 6000 DETAILS
("POST ENGINE")

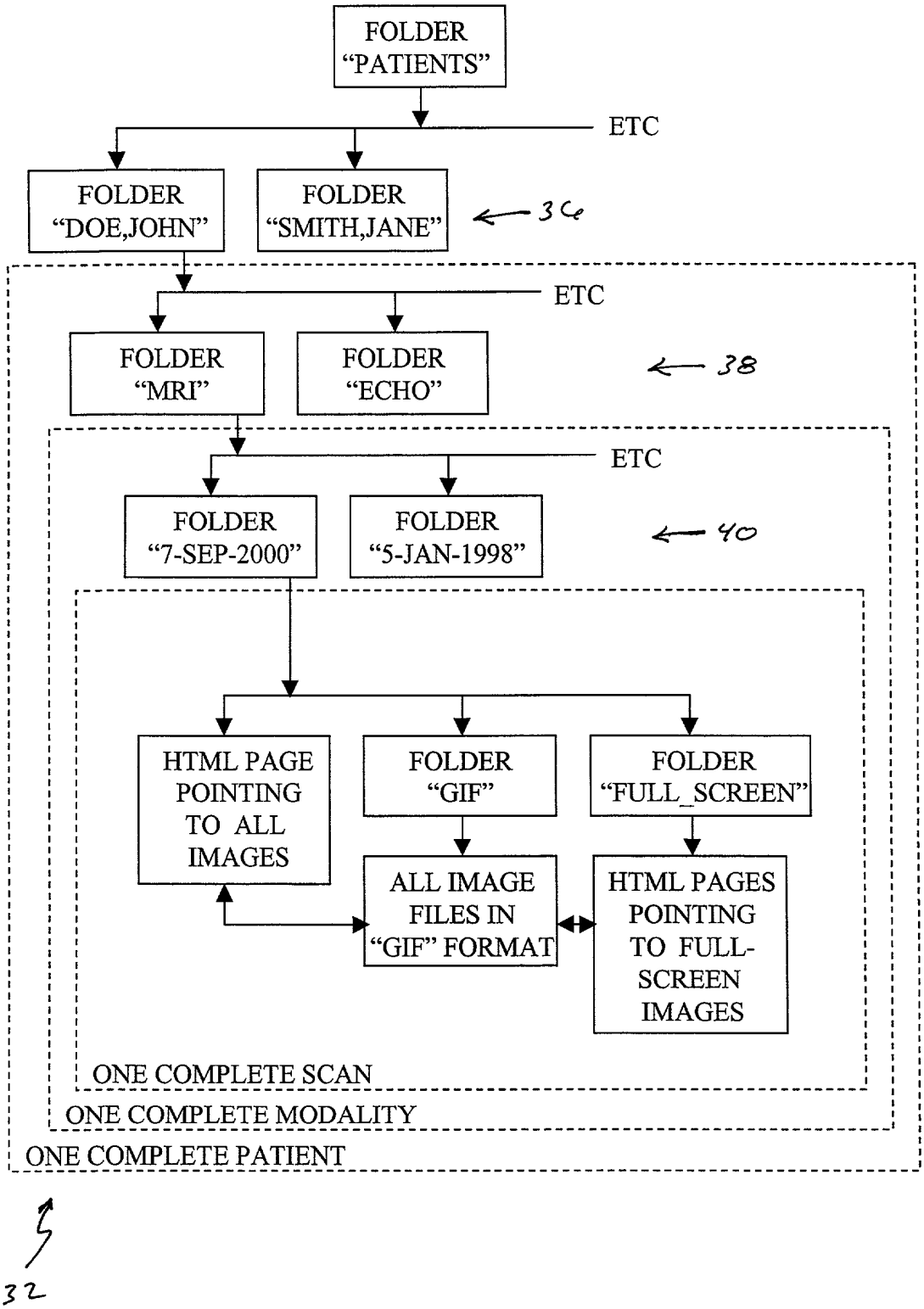


FIGURE 10 - STEP 7000 DETAILS ("WEB-COMPATIBLE DATABASE")

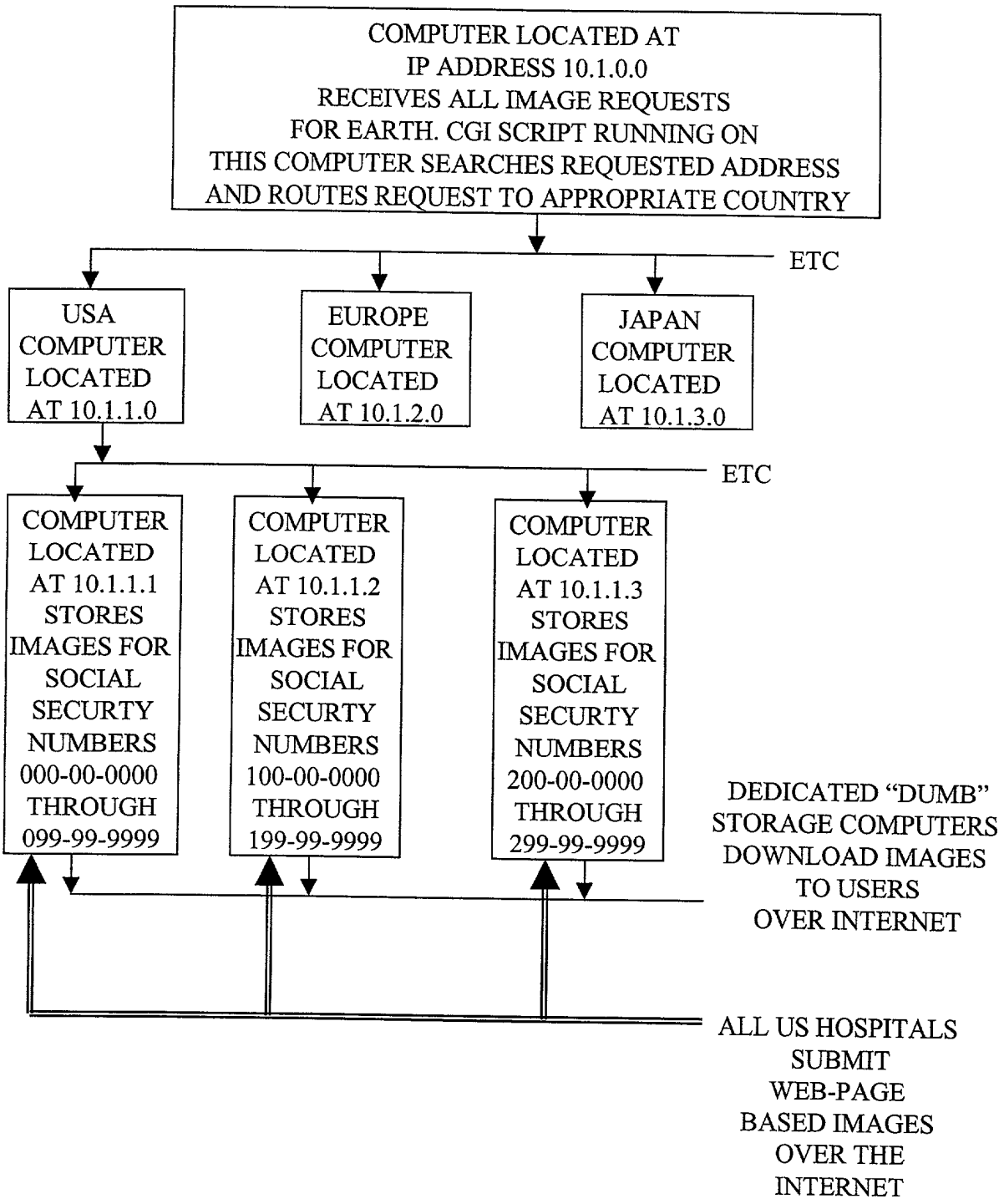


FIGURE 11 - STRUCTURE OF WORLD-WIDE DATABASE

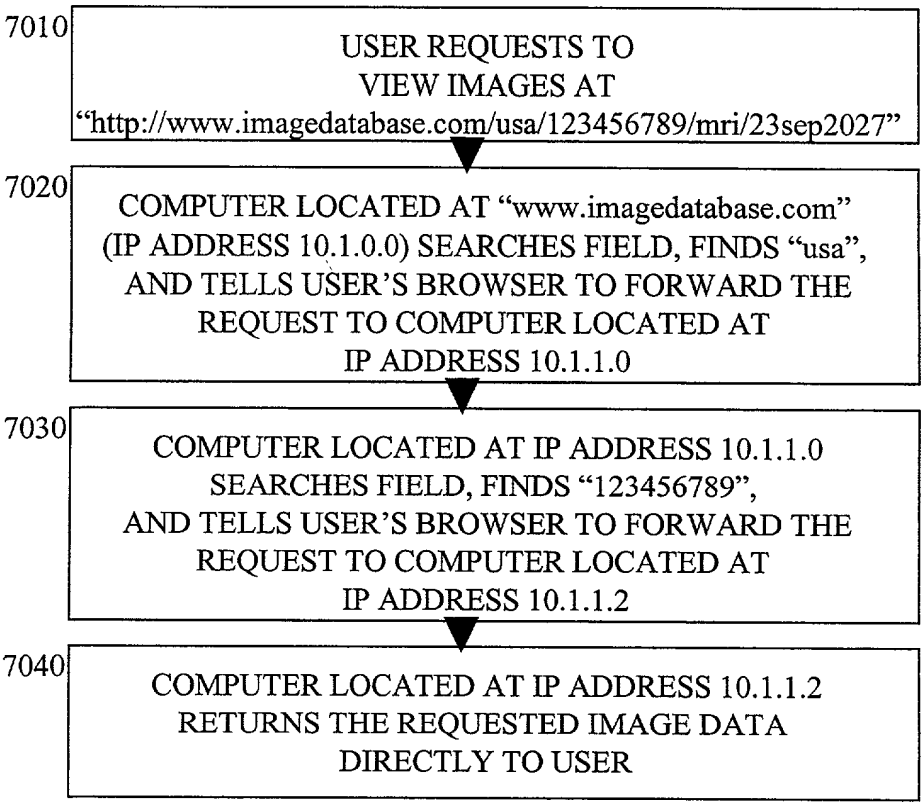


FIGURE 12 - PROCESSING USER REQUEST USING WORLD WIDE DATABASE

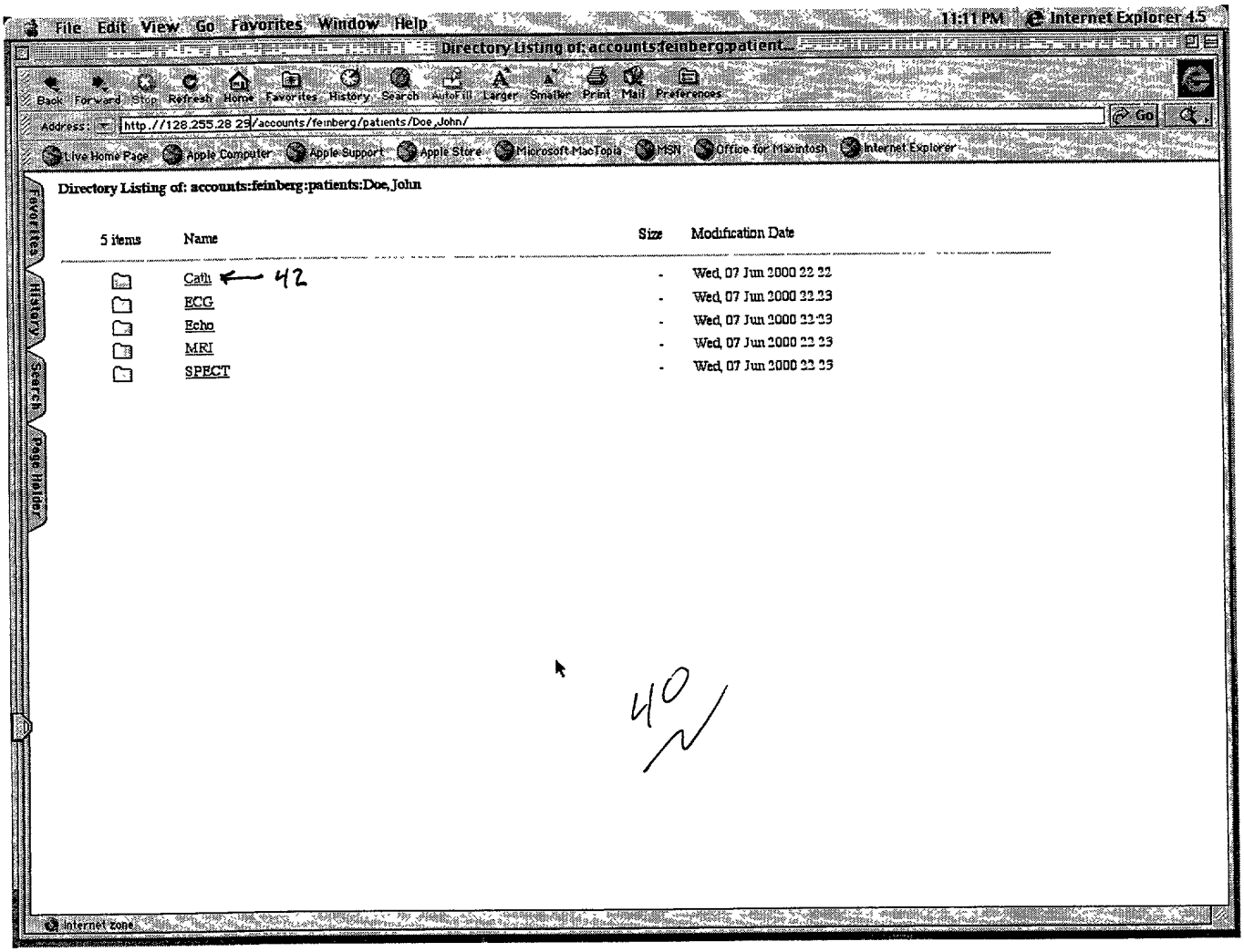

File Edit View Go Favorites Window Help
11:11 PM
Internet Explorer 4.5
Directory Listing of: accounts:feinberg:patient...
Back Forward Stop Refresh Home Favorites History Search AutoFill Larger Smaller Print Mail Preferences
Address: http://128.255.28.29/accounts/feinberg/patients/Doe,John/
Go
Live Home Page Apple Computer Apple Support Apple Store Microsoft MacTopia MSN Office for Macintosh Internet Explorer
Favorites History Search Page Holder
Directory Listing of: accounts:feinberg:patients:Doe,John
5 items
Name
Size
Modification Date
Cath
42
ECG
Echo
MRI
SPECT
Wed, 07 Jun 2000 22:22
Wed, 07 Jun 2000 22:23
Wed, 07 Jun 2000 22:23
Wed, 07 Jun 2000 22:23
Wed, 07 Jun 2000 22:23
40
Internet zone

FIGURE 13

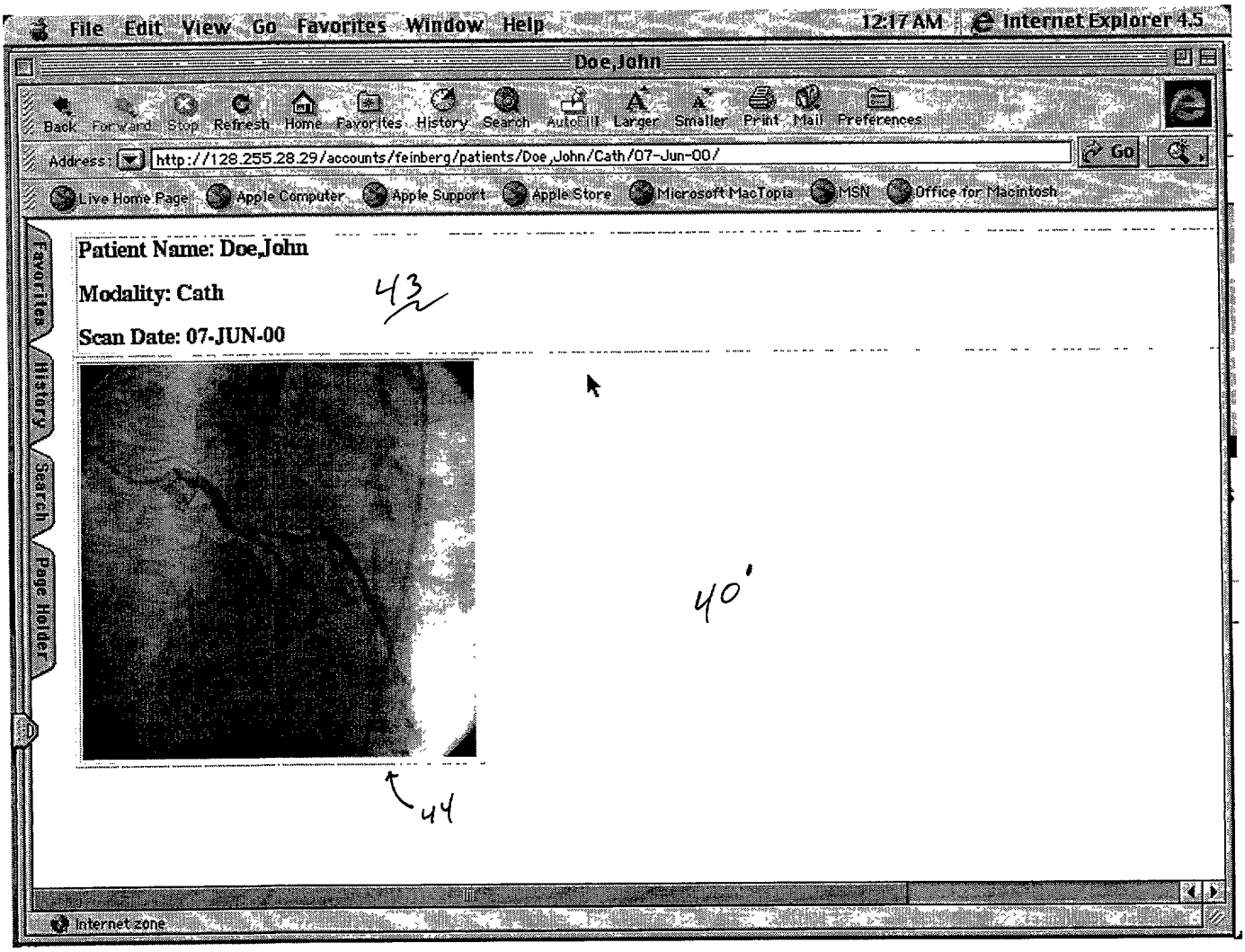

File Edit View Go Favorites Window Help
12:17 AM
Internet Explorer 4.5
Doe,John
Back Forward Stop Refresh Home Favorites History Search AutoFill Larger Smaller Print Mail Preferences
Address: http://128.255.28.29/accounts/feinberg/patients/Doe,John/Cath/07-Jun-00/
Go
Live Home Page Apple Computer Apple Support Apple Store Microsoft MacTopia MSN Office for Macintosh
Favorites History Search Page Holder
Patient Name: Doe,John
Modality: Cath
Scan Date: 07-JUN-00
43
40'
44
Internet zone

FIGURE 14

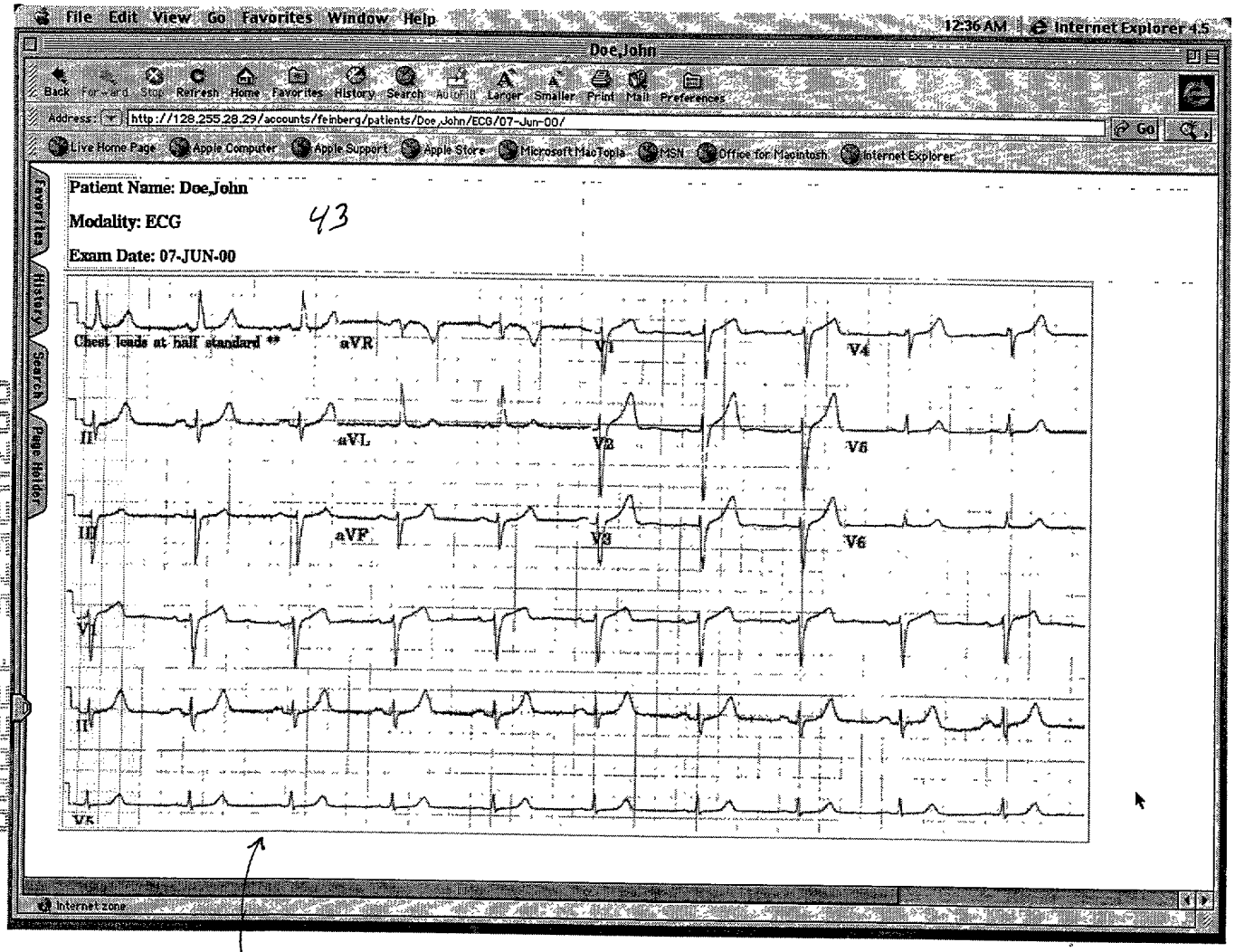

file Edit View Go Favorites Window Help
12:36 AM
Internet Explorer 4.5
Doe,John
Back Forward Stop Refresh Home Favorites History Search AutoFill Larger Smaller Print Mail Preferences
Address: http://128.255.28.29/accounts/feinberg/patients/Doe,John/ECG/07-Jun-00/
Go
Live Home Page Apple Computer Apple Support Apple Store Microsoft MacTopia MSN Office for Macintosh Internet Explorer
Favorites History Search Page Holder
Patient Name: Doe,John
Modality: ECG
43
Exam Date: 07-JUN-00
Chest leads at half standard **
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
VI
II
VR
Internet zone
44

FIGURE 15

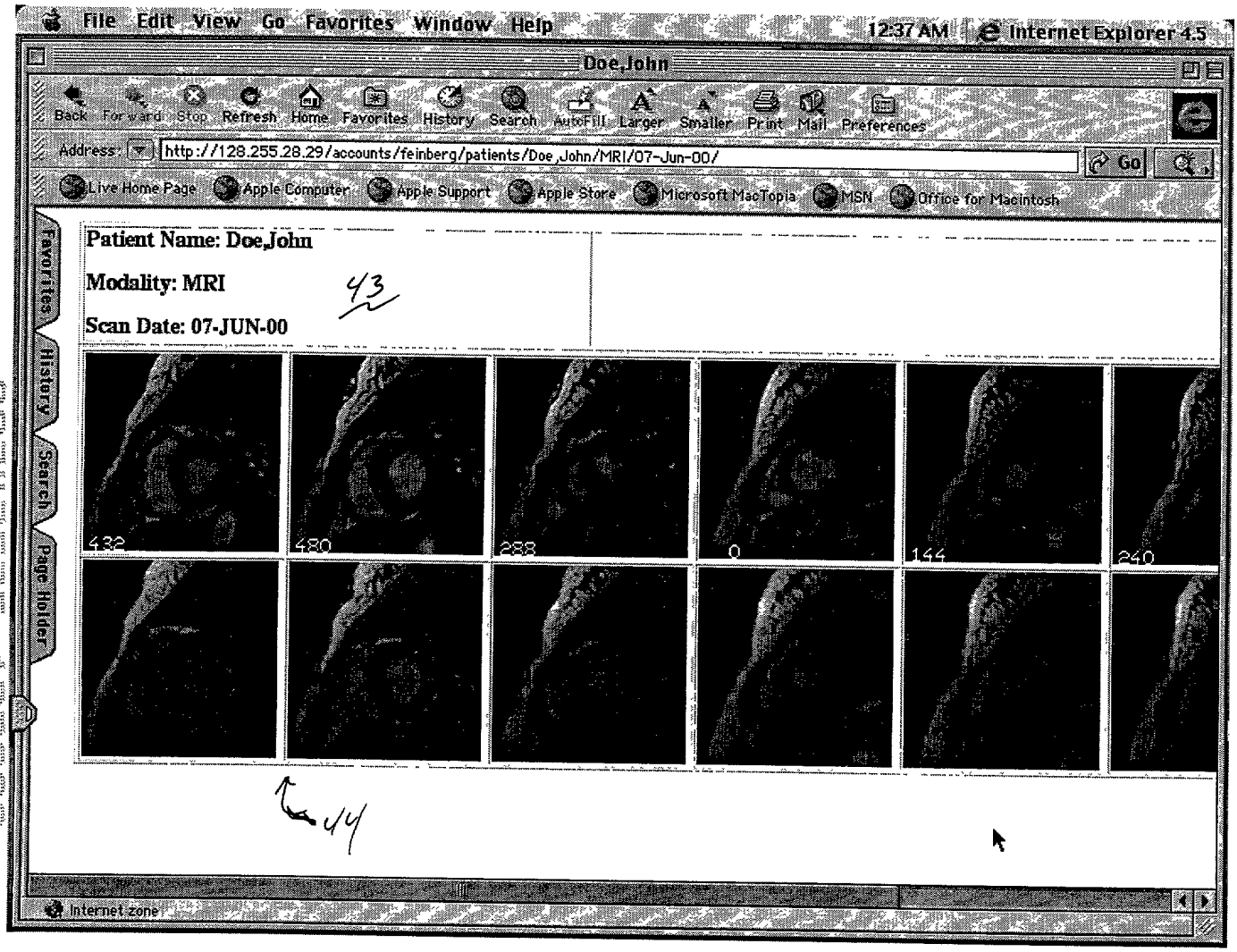

File Edit View Go Favorites Window Help
12:37 AM
Internet Explorer 4.5
Doe,John
Back Forward Stop Refresh Home Favorites History Search AutoFill Larger Smaller Print Mail Preferences
Address: http://128.255.28.29/accounts/feinberg/patients/Doe,John/MRI/07-Jun-00/
Go
Live Home Page Apple Computer Apple Support Apple Store Microsoft MacTopia MSN Office for Macintosh
Favorites History Search Page Holder
Patient Name: Doe,John
Modality: MRI
43
Scan Date: 07-JUN-00
432
480
288
0
144
240
44
Internet zone

FIGURE 16

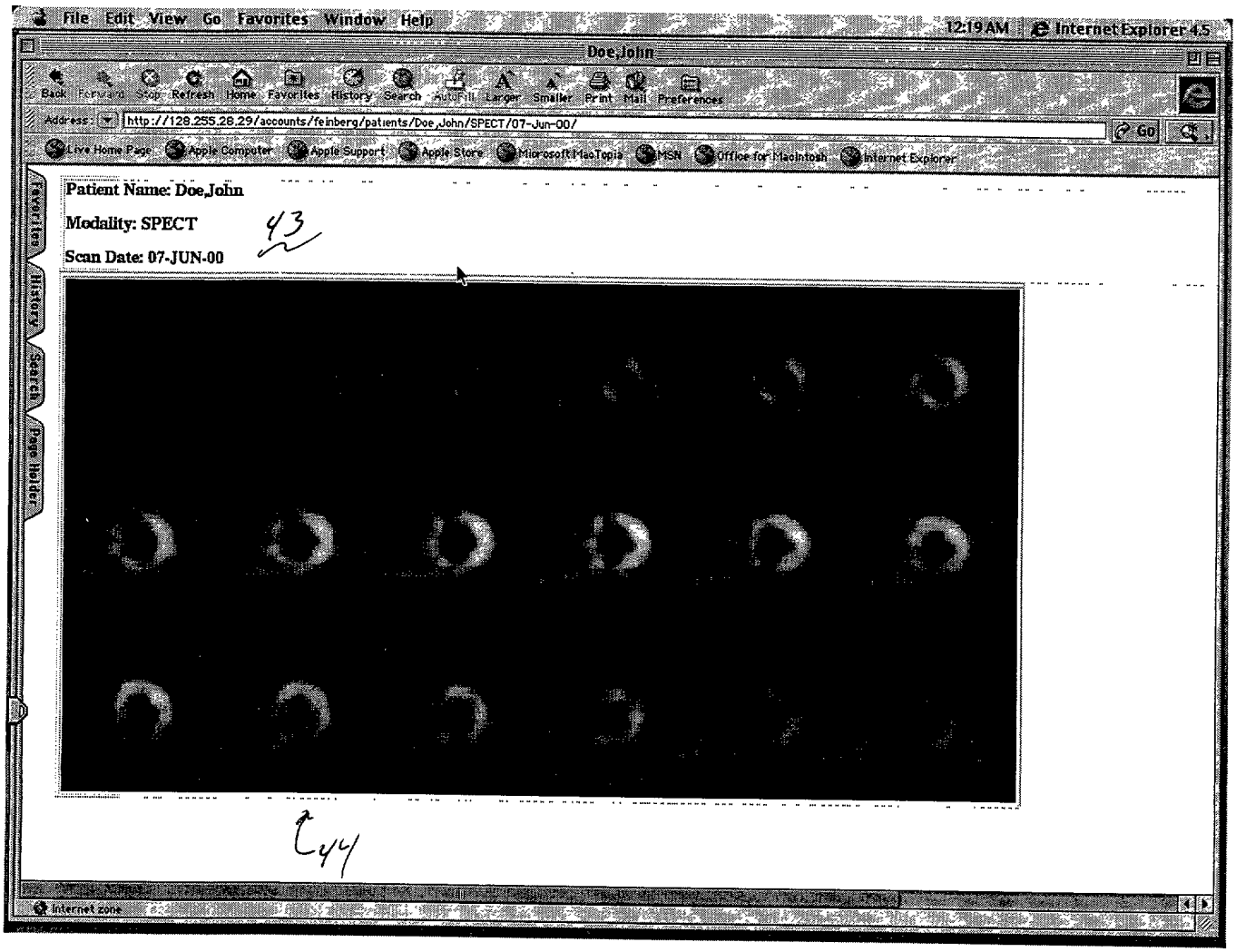

File Edit View Go Favorites Window Help
12:19 AM
Internet Explorer 4.5
Doe,John
Back Forward Stop Refresh Home Favorites History Search AutoFill Larger Smaller Print Mail Preferences
Address: http://128.255.28.29/accounts/feinberg/patients/Doe,John/SPECT/07-Jun-00/
Go
Live Home Page Apple Computer Apple Support Apple Store Microsoft MacTopia MSN Office for Macintosh Internet Explorer
Favorites History Search Page Holder
Patient Name: Doe,John
Modality: SPECT
Scan Date: 07-JUN-00
43
Internet zone

FIGURE 17